# Alcatel-Lucent OmniSwitch 9000

Chassis LAN Switch

The award winning Alcatel-Lucent OmniSwitch 9000 family (OS9000s) is a product line of full-featured, high-performance 10-Gigabit Ethernet chassis LAN switches that ranges from a low-cost, entry-point chassis.

The OS9000s deliver future-proof solutions with advanced security and QoS features for use in small-to-large enterprise cores, in the aggregation layer and in wiring closets with flexible power-over-Ethernet support. The OS9000s are a part of Alcatel-Lucent's end-to-end enterprise switch family.

The Alcatel-Lucent OmniSwitch 9000s are designed to anticipate future network needs with wire-rate processing for simultaneous IPv4 / IPv6 and support for unicast and multicast applications such as voice-over-IP and video collaboration.

The switches support future edge requirements as Gigabit Ethernet to the desktop becomes commonplace and demand for power-over-Ethernet (PoE) capability increases.
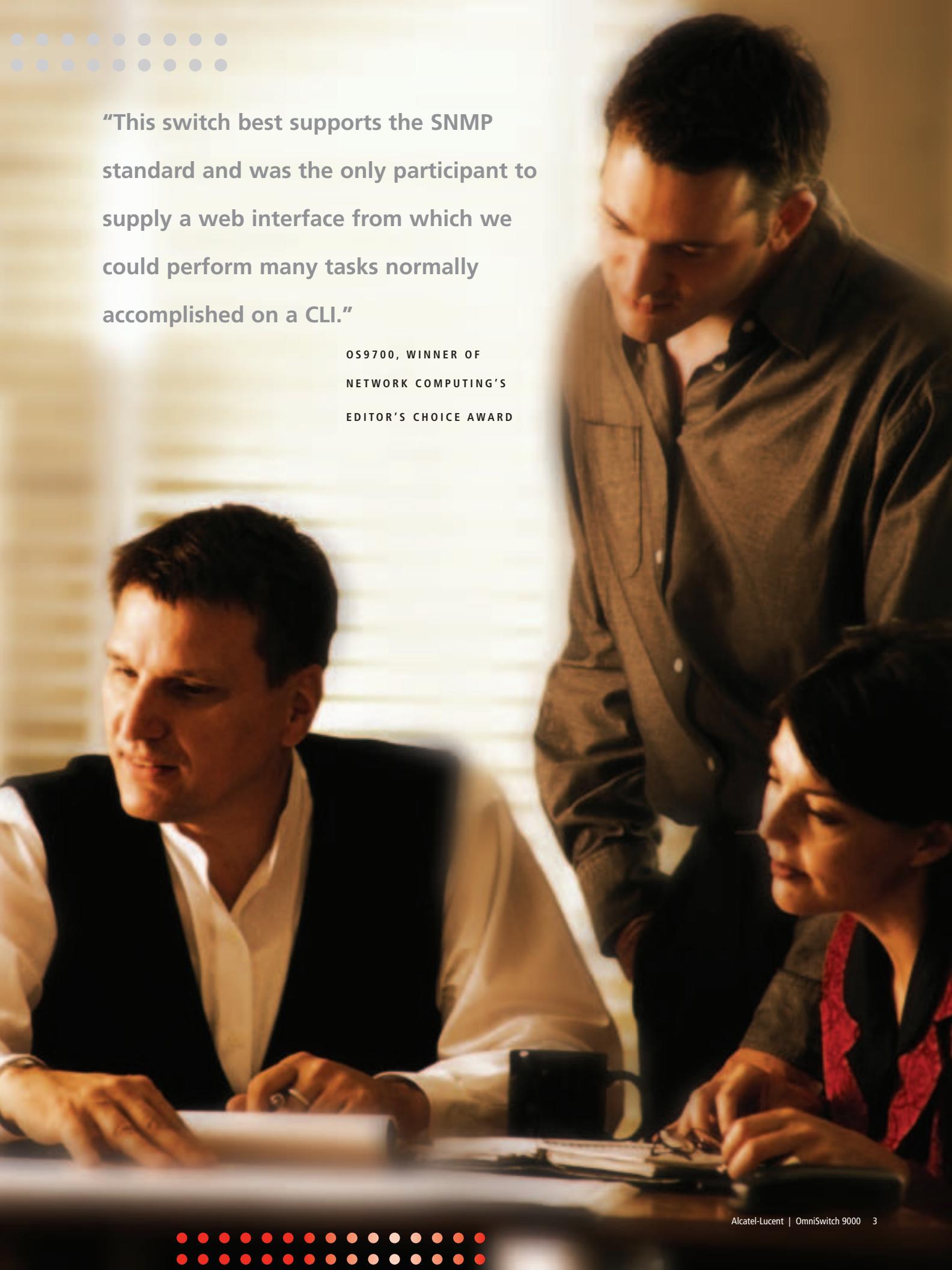
"This switch best supports the SNMP standard and was the only participant to supply a web interface from which we could perform many tasks normally accomplished on a CLI."

The Alcatel-Lucent OmniSwitch 9000 Family

The Alcatel-Lucent OmniSwitch 9000 family offers flexible features and benefits that make it an ideal switch to use throughout your network and works exceptionally well as a core or aggregation switch. The OS9000 family offers a common set of network interface (NI) modules that are compatible and interchangeable with all OS9000 models, reducing the cost of keeping spares and therefore lowering the total cost of ownership (TCO).

The OS9000 family offers a wide range of GigE and 10GigE interfaces that provide the industry's most flexible combination of Ethernet interfaces for use in a wiring closet. It also offers power-over-Ethernet to support IP phones, WLAN access points and video cameras. VoIP and video performance is also enhanced in an OmniSwitch-based network through the use of policy-based QoS using OmniVista NMS PolicyView.

Alcatel-Lucent OmniSwitch 9800

The Alcatel-Lucent OmniSwitch 9800 (OS9800) has an 18-slot chassis which provides the largest capacity available in the OS9000 family and is designed for those applications that require a large port density. Designed for smart continuous switching operations, the two center slots are dedicated to CMMs allowing redundant configurations, with 16 additional slots for network interface modules. The CMMs provide two critical functions – active standby resiliency for system control and active-active redundancy for the switching fabric. The 16 slots provide support for up to 768 GigE ports or 96 10 GigE ports. Plus, key OS9800's sub-components – such as network interface cards (NICs) and the power supply units (PSU) – are compatible and interchangeable with all other OS9000s as well as the fan trays with the OS9700, reducing the cost of keeping spares and lowering the total cost of ownership.
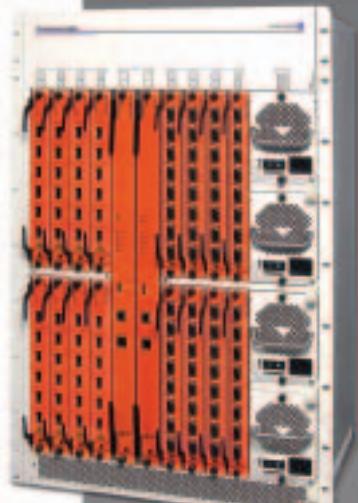
OmniSwitch 9800

Alcatel-Lucent OmniSwitch 9700

The Alcatel-Lucent OmniSwitch 9700 (OS9700) has a 10-slot chassis that offers high-density capacity supporting an aggregation of up to 384 GigE ports or 48 10GigE ports. The OS9700 supports two slots for CMMs and has eight additional slots for network interface modules. Similar to the OS9800, the OS9700 has been designed for smart continuous switching operation whenever used in a redundant configuration. The Alcatel-Lucent OmniSwitch 9700 was named as Network Computing's Editor's Choice for its superb manageability and ease of use.
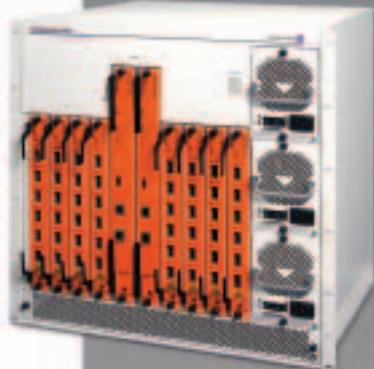
OmniSwitch 9700

Alcatel-Lucent OmniSwitch 9600

The Alcatel-Lucent OmniSwitch 9600 (OS9600) features a 5-slot chassis making it Alcatel-Lucent's low-cost, entry-point LAN switch solution that provides the small enterprise the best performance-to-price available today. The OS9600 supports a single CMM and four network interface modules. The OS9600 also future proofs the investment since the network can be expanded inexpensively by reusing all components in an OS9700 including the CMM, the OS9000 network interface modules, the power supplies, and the large power-over-Ethernet shelf. By offering the same features and capabilities as the other OmniSwitch 9000 switches, the OS9600 provides enterprise businesses an affordable core that supports converged voice, video, data and other applications.
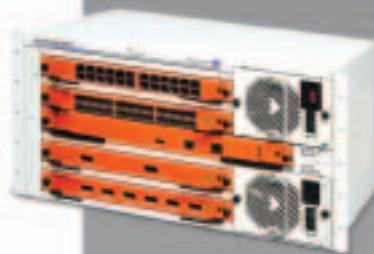
OmniSwitch 9600

PRODUCT FEATURES AND BENEFITS

The OS9000 switch family addresses the needs of converged networks: high availability, wire-speed performance, high density GigE and 10GigE, and improved network response time.

The OS9000 family provides an easy and economical way to upgrade or deploy a new Ethernet network. The large number of ports makes the OmniSwitch 9000s suitable for two- or three-tier network designs. This is possible because of the high performance capability and density of GigE and 10GigE. The OS9000s also future proofs the network with native and full support of simultaneous IPv4 / IPv6 for addressing migration from IPv4 to IPv6 or new IPv6 deployments.

The OS9000s are engineered to be deployed in the:

- Enterprise core
- Data center
- Wiring closet
- Aggregation layer

OmniSwitch 9700

Locally Processed Requests

Virtual Switching Fabric

CMM Monitoring & Sychronization

STP BPDU ARP Request

CPU

CPU CPU

CPU

Routing Update Management Access

Centrally Processed Requests

NI 1

CMM A
Active Control

CMM B
Standby Control

NI 8

Active Gigabit Ethernet Connection

Standby Gigabit Ethernet Connection
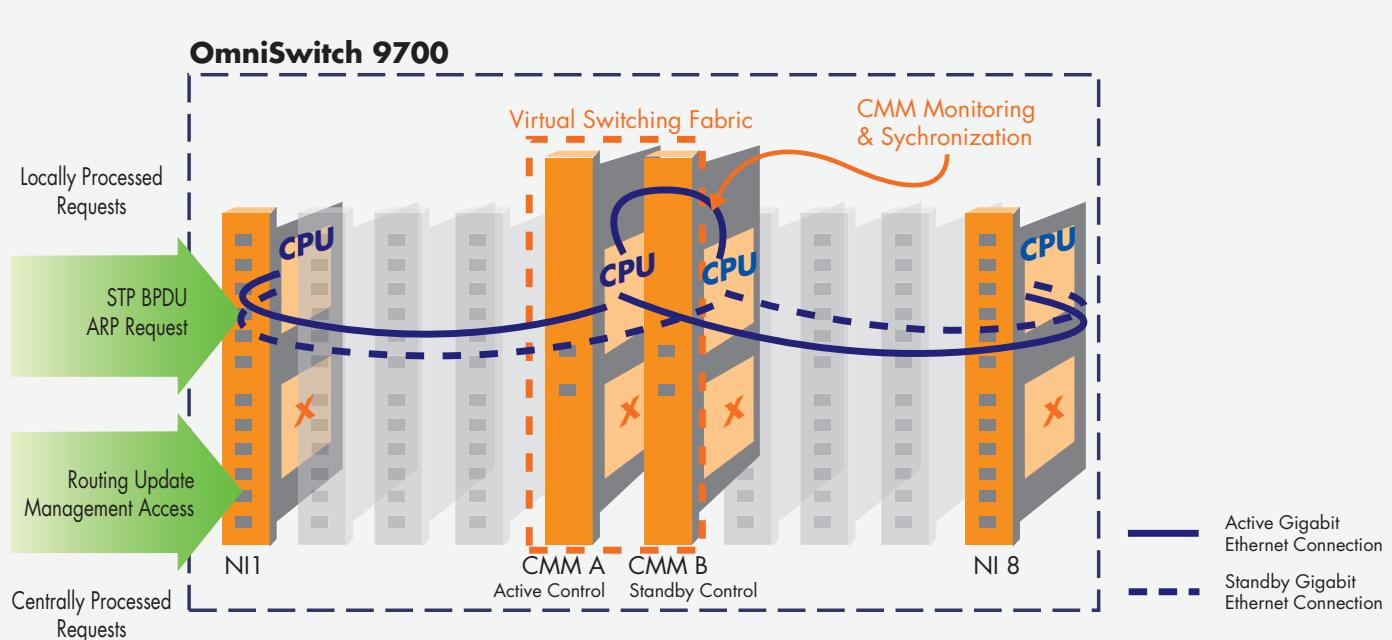
Principle of operation for distributed intelligence

HIGH PERFORMANCE FOR CONVERGED NETWORKS

The OS9000 family is designed for resiliency and exceptional network performance to support real-time triple-play applications such as voice-over-IP (VoIP), data and video applications. Applications are supported by:

- High-port density
- High-capacity switching and traffic aggregation for enterprise network cores
- Highly-available switching fabric with a unique load sharing capability[1]
- Multi-layer security
- Wire speed packet classification

SIMPLIFIED NETWORK MANAGEMENT

Network management is simplified by providing users with familiar commands and user interfaces since all OmniSwitch products use the same Alcatel-Lucent Operating System (AOS) and are completely integrated with the Alcatel-Lucent OmniVista Network Management System (NMS). Alcatel-Lucent also offers other management options such as WebView, which is a web-based user-friendly element manager, a command line interface (CLI) and SNMP for third-party network management systems. No feature is exclusive to one management method. All are equal which leaves it to the administrator to select his or her preferred option.

Fans Redundancy
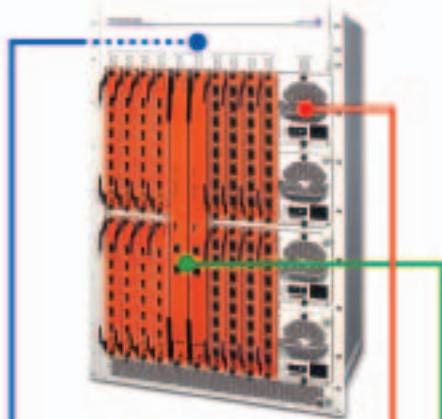
CMM Redundancy
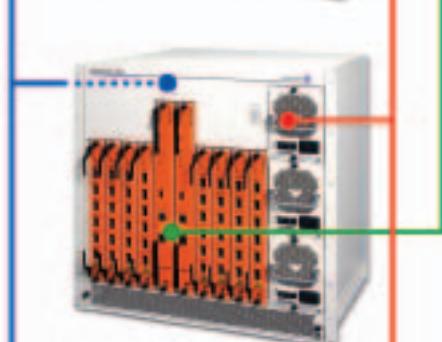
Power Redundancy

OmniSwitch 9000 full redundancy

Alcatel-Lucent secures the network with proactive and reactive capabilities that are provided through Alcatel-Lucent Access Guardian and the Alcatel-Lucent OmniVista 2770 Quarantine Manager.

Alcatel-Lucent's Access Guardian enables proactive, network-wide security through auto-sense authentication that runs on the OmniSwitch, preventing unauthorized network access. The Alcatel-Lucent OmniVista 2770 Quarantine Manager provides reactive security by automatically handling malicious attacks by taking intrusion information and dynamically reconfiguring the network to contain the attack.

ACCESS GUARDIAN

Alcatel-Lucent Access Guardian provides identity based network access to enable enforcement of device and network security policies, resulting in increased privacy and availability of communications. Access Guardian authenticates network users, confirms their PC's conformance to security policies, and then provides access rights based on the user's role. Using Access Guardian, the network is able to provide secure access to all authorized users including IP phones and other network devices, regardless of the vendor. All while protecting the privacy and availability of your business' communications.

AQM

The Alcatel-Lucent OmniVista Quarantine Manager is an open, attack containment solution that defends against attacks at the network and application levels by isolating misbehaving users and providing a means for user remediation. It integrates quarantine information from any IDS or source of information about an attack and can locate and isolate an attacking device on any switch or wireless LAN switch in the network.

Although third-party switches can quarantine a port, when the OmniVista Quarantine Manager is used with an Alcatel-Lucent OmniSwitch it is able to offer options to either isolate or quarantine only the offending user while keeping network access to any other users on the same port open.

Medium-sized network
Two tier, single data center/building

Large-sized Network
Three tier, multi data center/building

OmniSwitch 9700   OmniSwitch 9700

10 GigE Link
Aggregation

OmniSwitch 9800   OmniSwitch 9800

Core

Dual core network
for maximal redundancy

OS9700   OS9600

Aggregation

10 GigE Dual Attachments
(L2/L3 based on design)

Edge

OmniSwitch 6850

OmniSwitch 9600   OmniSwitch 6850

ENTERPRISE CORE / DATA CENTER

The OS9000s address enterprise network core requirements with:

- Enhanced VoIP and video performance with policy-based QoS

- Future-proof support for multi-media applications with wire-rate multicast

- Enhanced forwarding – improves network response time through hardware-based forwarding at first packet and elimination of CPU solicitation for ACL/QoS demands

- High-availability from complete redundancy of all critical components, from a distributed architecture, and from fabric availability plus extensive support of L2/L3 protocols for smart use of network topology redundancies
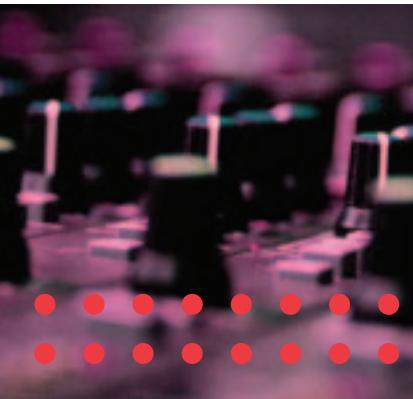
AGGREGATION LAYER

The OS9000s address aggregation requirements with:

- Higher 10G port density than competitive products
- Increased options for wire-rate GigE ports (copper, fiber, PoE)

WIRING CLOSET CONNECTIVITY

The OS9000 addresses wiring closet requirements with:

- Full power-over-Ethernet support for IP phones, WLAN access points and video cameras with up to 2400W of power through dedicated power shelves
- Isolation of intruders with OmniVista 2770 Quarantine Manager
- Flexible authentication with Access Guardian

- Extensive support of AOS user-oriented features such as user authentication, learned port security (LPS), group mobility, and port mapping
- New 48-port 10/100/1000 module with up to 768 ports in a single, redundant system
- New 22-port module with 20 ports of copper and fiber (RJ-45, software upgradeable from 10/100 to 10/100/1000) and 2-ports of 100/1000 SFP (fiber)

HIGHEST AVAILABILITY FOR THE ENTERPRISE

The OmniSwitch 9000s carry on Alcatel-Lucent's tradition of providing the highest availability possible to support the demands of IP communications and mission-critical applications, all at an enterprise price. Providing the highest availability to the enterprise ensures that users have constant access to resources and services at all times. To ensure the highest levels of availability, the OmniSwitch 9000s provide:

- Distributed architecture, where each NI autonomously supports functions, such as source learning, Spanning Tree functions, and L2/L3 forwarding
- Redundant modules and sub-components (CMMs[1], fans and PSUs)
- Hot swappable modules and sub-components (NIs, CMMs[1], fan trays, PSUs, SFPs and XFPs)
- Hitless loading of optional software (routing / security), without re-booting
- Image rollback to automatically re-load previous configurations and software versions for "easier" remote site management

(1) Requires dual CMMs in either the OS 9700 or the OS 9800

Network resiliency is critical to providing network availability. The OS9000s offer a superior architecture with no single point of failure and a subsecond fail-over in its redundant configuration. In the event of a CMM failure on an OmniSwitch 9800 or OmniSwitch 9700, they are able to provide continuous operation with no loss of connections when deployed with dual CMMs. Existing L2/L3 traffic, including voice conversations, will continue seamlessly without interruption.

For single CMM configurations, network resiliency is achieved through switch redundancy, network path redundancy, and the L2/L3 protocols for smart use of the switch and path redundancy. In this configuration, the OmniSwitch 9600 offers the best price/performance ratios.

DISTRIBUTED INTELLIGENCE

Unlike other switches on the market, Alcatel-Lucent OmniSwitch are unique in that they are able to provide Smart Continuous Switching by using a design where most processes are distributed and handled on the network interfaces themselves, relegating the CMM to a coordination role. A bottleneck is avoided by not using a centralized control plane architecture where the CMM – the key management module – is responsible for all processing. The distributed design allows key processes such as Spanning Tree to maintain a fully operational state, even during a sub-second CMM failover.

With networks under constant attack from the outside world and even from within the company, a network needs to provide easy access to users and resources, yet possess extensive security features that can be managed across a global enterprise.

The OS9000s provide multi-layer security with a range of security features that can be implemented in the wiring closet, the core, and throughout the network. These include:

- User authentication
- Virtual local area networks (VLANs)
- Quarantine VLANs
- Access control lists (ACLs)
- Capable of filtering unexpected control traffic (BPDU, RIP, OSPF, BGP) from user ports
- Prevents IP source address spoofing
- Authenticated switch access
- Encryption for secure management (SSHv2 / HTTPs / SNMPv3)
- Denial of service protection

Multi-layer security enables the building of sophisticated hardware and software-based solutions that can be integrated with policy-based management and other technologies such as smart cards, PKI, and biometrics for enhanced security implementations. For secure management there are many features integrated into the architecture including authenticated user access, SNMPv3 and SSL for encrypted sessions, and partitioned management for multi-tiered access and granular network administration.

ADVANCED NETWORK POLICIES FOR SECURE AND CONVERGED NETWORKS

Advanced network policies ensure that users and applications get the priority and performance they need with ease of use management that extends across the enterprise. The OS9000s feature state-of-the-art ASIC-based technology for intelligent, wire-speed everything including switching, routing, ACLs, QoS, traffic redirection and load balancing.

The OS9000s provide application aware switching for layers 2, 3, and 4 and the most advanced classification, prioritization, and queuing schemes in the industry. It also supports industry classification standards including 802.1Q/p, TOS, and DiffServ, and is enhanced with complementary features such as extensive QoS mappings and re-tagging of prioritization. And, the OS9000s don't require additional hardware or specialized software to operate at wire-speed – from the first packet!
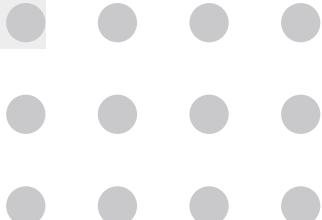
## ALCATEL-LUCENT OMNIVISTA AND ONETOUCH MANAGEABILITY

OmniVista, the Alcatel-Lucent voice and data network management platform, is a comprehensive set of network management applications and tools that simplify the management of Alcatel-Lucent networking devices. OmniVista allows managers to monitor network activity, configure and troubleshoot each device, as well as manage an entire network from a single platform.

It offers unified management, network-wide visibility, element management, VLAN management, policy-based QoS, centralized management of secure switch access, quarantine capabilities to prevent security breaches by isolating potential threats – all within a scalable architecture.

OmniVista features OneTouch manageability enabling network managers to quickly configure and manage the switches in their network. For example, OneTouch QoS, a feature of the Alcatel-Lucent policy management software, allows network managers to quickly assign QoS priorities to network traffic based on the characteristics of different applications. With "one-click," every Alcatel-Lucent switch in the network is automatically configured.
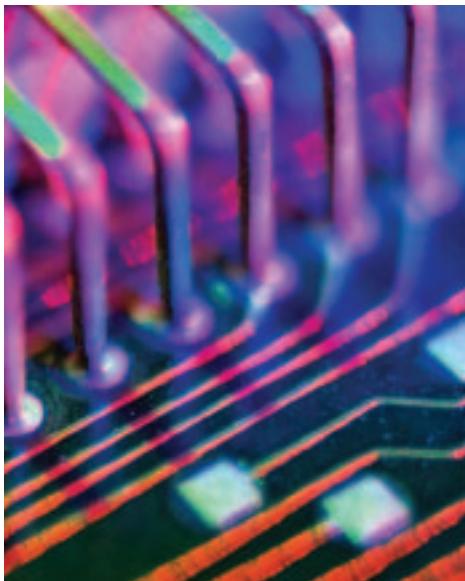
Alcatel-Lucent's OmniVista Quarantine Manager proactively and defensively identifies and isolates viruses and network attacks before they wreak havoc on the network and automates the response for a self-healing network.

The OS9000s offer service level and policy-based configurations with support for LDAP directories enabling flexible integration with existing platforms and allowing extended offerings. RMON and sFlow ™ support is also included with a choice of interfaces for administrators – a command line interface (CLI), SNMPv3, a fully editable text-based configuration file, and and WebView our OmniSwitch web-based interface.
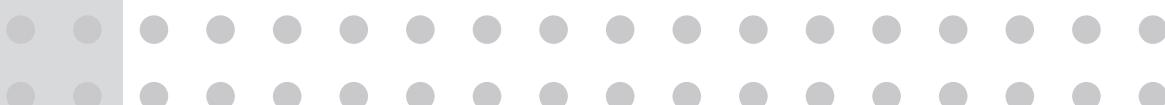
IPV6 SUPPORT

The OmniSwitch 9000 family provides full IPv6 support, and wire-rate performance on classifying, forwarding and tunneling to address various corporate and government requirements for IPv6.

Unlike most switches that support IPv6, the performance of the OS9000s is unaffected by enabling IPv6 processing whether deploying IPv4, IPv6, or IPv4/IPv6. These switches address the U.S. Federal government Department of Defense (DoD) requirement that IPv6 be supported for migration by 2008 and addresses other countries' requirements including:

The OmniSwitch 9000s are certified as "IPv6 Ready"

- Ability to connect to the IPv6 backbone
- Use of IPv6 across public organizations

- Ability to interconnect the IPv6 "island" through an existing IPv4 network through hardware-based tunneling

- Ability to control IPv6 flows with extensive QoS/ACL policies

The OmniSwitch 9000 family provides hardware-based classification for access control lists (ACLs) and quality of service (QoS). More importantly it provides a way to transition from an existing IPv4 network with support of tunneling (configured 6-in-4). The OmniSwitch 9000s are able to work with the existing AOS switches, and support the full suite of unicast routing protocols, multicast registration and routing protocols, QoS/ACLs and tunneling.

FIRST GREEN SWITCH IN THE MARKET – ROHS COMPLIANCY

Alcatel-Lucent is the first switch manufacturer to be in compliance with directives from around the world that require electronic equipment to be free of hazardous substances. The Alcatel-Lucent OmniSwitch 9000 family meets those requirements and was the first to meet the European Community's directive called Restriction on Hazardous Substances in Electrical and Electronic Equipment (RoHS). The whole world benefits from these "green" switches by lessening the amount of hazardous substances that find their way into the environment.

Technical Specifications

Network Interface

All modules are hot swappable and can be used in any available NIs slot.

- 2-port 10GBaseX (XFP)
- 6-port 10GBaseX (XFP)
- 24-port 1000BaseX (SFP)
- 24-port 10/100/1000BaseT (RJ45)
- 24-port PoE 10/100/1000BaseT (RJ45)
- 48-port 10/100/1000BaseT (MRJ21)
- 20-port 10/100BaseT (RJ45, SW upgradable to 10/100/1000) and 2-port 100/1000BaseX (SFP)

Dimensions

OMNISWITCH 9800

- Height: 29.75 in (75.6 cm – 17 RU)
- Width: 17.4 in (44.2 cm)
- Depth: 17.30 in (44.0 cm)
- Weight (fully loaded chassis): <190 lbs (85 kg)

OMNISWITCH 9700

- Height: 19.25 in (48.9 cm – 11 RU)
- Width: 17.4 in (44.2 cm)
- Depth: 17.30 in (44.0 cm)
- Weight (fully loaded chassis): <130 lbs (60 kg)

OMNISWITCH 9600

- Height: 9.6 in (24.4 cm – 5.5 RU)
- Width: 17.45 in (44.3 cm)
- Depth: 14.45 in (36.7 cm)
- Weight (fully loaded chassis): <55 lbs (25 kg)

POWER-OVER-ETHERNET (POWER SHELF)

- Height: 5.0 in (12.7 cm – 2.9 RU)
- Width: 16.25 in (41.3 cm)
- Depth: 15.15 in (38.51cm)
- Weight (fully loaded shelf): <22 lbs (10 kg)

POWER-OVER-ETHERNET (230W / 390W W/ MOUNTING BRACKETS)

- Height: 1.73 in (4.4 cm – 1 RU)
- Width: 19.0 in (48.3 cm)
- Depth: 7.0 in (17.9 cm)
- Weight (fully loaded shelf): <2 lbs (0.6 kg)

Power Supply and Power Consumption

600 W AC POWER SUPPLY

- Input voltage: 100-240 VAC auto-ranging
- Operating frequency: 47-63 Hz
- Maximum input current:
- 7.5A at 110 VAC; 3.65 A at 220 VAC

POWER CONSUMPTION

- OS9600 Chassis and fan trays: <42 W
- OS9700 / OS9800 Chassis and fan trays: <80 W
- OS9600-CMM / OS9700-CMM: <27W
- OS9800-CMM: <40W
- OS9-XNI-U2: <36W
- OS9-XNI-U6: <67W
- OS9-GNI C24/P24/U24/C20L : <56W
- OS9-GNI C48T: <79W
- PSU efficiency: > 0.75

Environmental requirements

OPERATING TEMPERATURE:

- 32° to 113°F (0° to 45°C)

STORAGE TEMPERATURE:

- 14° to 158°F (-10° to 70°C)

HUMIDITY (OPERATING AND STORAGE):

- 10% to 90% non-condensing

HEAT DISSIPATION (FULLY LOADED W/ C48T AND REDUNDANCY):

- OmniSwitch 9600: 1,750 BTU/hr, max
- OmniSwitch 9700: 3,485 BTU/hr, max
- OmniSwitch 9800: 6,480 BTU/hr, max

Emissions / Agency Approvals

- CISPR 22 Class A
- FCC Part 15 Class A
- EN 55022 Class A
- ICES-003 Class A
- AS/NZS 3548 / EN55022 Class A
- EN 61000-3-2, EN 61000-3-3
- VCCI Class A

Immunity

- EN 55024: 1998
- EN 61000-4-2 to 61000-4-6, EN 61000-4-8, EN 61000-4-11

Safety Agency Certifications

- UL 60950
- IEC 60950-1:2001; all national deviations
- EN 60950-1: 2001; all deviations
- CAN/CSA-C22.2 No. 60950-1-03
- NOM-019 SCFI, Mexico;
- AS/NZ TS-001 and 60950:2000, Australia
- UL-AR, Argentina
- UL-GS Mark, Germany
- EN 60825-1 Laser, EN60825-2 Laser
- CDRH Laser
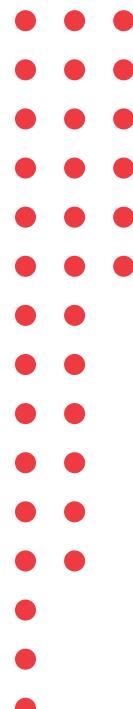
Technical Specifications

IEEE Standards

- IEEE 802.1ad (VLAN Stacking)
- IEEE 802.1D (STP)
- IEEE 802.1p (CoS)
- IEEE 802.1Q (VLANs)
- IEEE 802.1s (MSTP)
- IEEE 802.1w (RSTP)
- IEEE 802.1X (Port-based NAC)
- IEEE 802.3i (10BaseT)
- IEEE 802.3u (Fast Ethernet)
- IEEE 802.3x (Flow Control)
- IEEE 802.3z (Gigabit Ethernet)
- IEEE 802.3ab (1000BaseT)
- IEEE 802.3ac (VLAN Tagging)
- IEEE 802.3ad (Link Aggregation)
- IEEE 802.3af (Power-over-Ethernet)

IETF Standards

MANAGEABILITY

- RFC 854/855 Telnet and Telnet options
- RFC 1215 Convention for SNMP Traps
- RFC 2616 /2854 HTTP and HTML
- RFC 2096 IP MIB
- RFC 1212/2737 MIB and MIB-II
- RFC 1643/2665 Ethernet MIB
- RFC 2668/3636 IEEE 802.3 MAU MIB
- RFC 1573/2233/2863 Private Interface MIB
- RFC 1155/2578-2580 SMI v1 and SMI v2
- RFC 1157/2271 SNMP
- RFC 1213/2011-2013 SNMP v2 MIB
- RFC 1901-1908/3416-3418 SNMP v2c
- RFC 2570-2576/3411-3415 SNMP v3
- RFC 2667 IP Tunneling MIB
- RFC 2674 VLAN MIB

SECURITY

- RFC 2104 HMAC Message Authentication
- RFC 1321 MD5
- RFC 2284 PPP EAP
- RFC 2139/2866/2867/2620 RADIUS

ACCOUNTING AND CLIENT MIB

- RFC 2138/2865/2868/3575/2618 RADIUS

AUTHENTICATION AND CLIENT MIB

- RFC 2869/2869bis RADIUS Extension
- RFC 2228 sFTP
- RFC 959/2640 FTP

IP AND ROUTING

BGP

- RFC 1771-1774/2842/2918/3392 BGP v4
- RFC 1269/1657 BGP v3 and v4 MIB
- RFC 3065 BGP AS Confederations
- RFC 2385 BGP MD5 Signature
- RFC 2042 BGP New Attribute
- RFC 2439 BGP Route Flap Damping
- RFC 2796 BGP Route Reflection
- RFC 1965 BGP AS Confederations
- RFC 1997/1998 BGP Communities Attribute
- RFC 1966 BGP Route Reflection
- RFC 1403/1745 BGP/OSPF Interaction

OSPF

- RFC 1253/1850/2328 OSPF v2 and MIB
- RFC 1765 OSPF Database Overflow
- RFC 3623 OSPF Graceful Restart
- RFC 2154 OSPF MD5 Signature
- RFC 1587/3101 OSPF NSSA Option
- RFC 2370/3630 OSPF Opaque LSA

RIP

- RFC 1058 RIP v1
- RFC 1722/1723/2453/1724 RIP v2 and MIB
- RFC 1812/2644 IPv4 Router Requirement
- RFC 2080 RIP ng

IP MULTICAST

- RFC 1112 IGMP v1
- RFC 2236/2933 IGMP v2 and MIB
- RFC 3376 IGMPv3
- RFC 1075 DVMRP
- RFC 2934 PIM MIB for IPv4
- RFC 2362 PIM-SM
- RFC 2365 Multicast
- RFC 2715/2932 Multicast Routing MIB

IPV6

- RFC 2292/2373/2374/2460/2462 IPv6
- RFC 2464/2553/3493/3513 IPv6
- RFC 3542/3587/4213/4291 IPv6
- RFC 2461 NDP
- RFC 2463/2466/4443 ICMP v6 and MIB
- RFC 1886/3596 DNS for IPv6
- RFC 2452/2454 IPv6 TCP/UDP MIB
- RFC 2740 OSPF for IPv6
- RFC 2545/2858 MP Extensions for BGP-4
- RFC 2893/3056 IPv6 Tunneling

QUALITY OF SERVICE

- RFC 896 Congestion control
- RFC 3635 Pause Control
- RFC 1122 Internet Hosts
- RFC 2474/2475/2597/3168/3246 DiffServ

OTHERS

- RFC 3176 sFlow
- RFC 826/903 ARP and Reverse ARP
- RFC 925/1027 Multi LAN ARP / Proxy ARP
- RFC 951 Bootp
- RFC 1493 Bridge MIB
- RFC 919/922 Broadcasting internet datagram
- RFC 1518/1519 CIDR
- RFC 1541/1542/2131/3396/3442 DHCP
- RFC 2132 DHCP Options
- RFC 2131/3046 DHCP/BootP Relay
- RFC 792 ICMP
- RFC 791/894/1024/1349 IP and IP / Ethernet
- RFC 2251 LDAP v3
- RFC 1305/2030 NTP v3 and Simple NTP
- RFC 1191 Path MTU Discovery
- RFC 3060 Policy Core
- RFC 1151 RDP
- RFC 1757/2819 RMON and MIB
- RFC 950 Subnetting
- RFC 793/1156 TCP/IP and MIB
- RFC 768 UDP
- RFC 2338/3768/2787 VRRP and MIB
- RFC 1256 ICMP Router Discovery

Warranty

1 year on hardware, 90 days on software
Additional and optional support available

Technical Specifications

Layer-2 Switching

VLAN
- Port based, IEEE 802.1Q VLANs
- Advanced VLAN Classification: MAC, protocol, IP subnet
- IEEE 802.1ad VLAN Stacking (a.k.a. QinQ)

SPANNING TREE
- IEEE 802.1D Spanning Tree Protocol (STP) – 1998 / 2004 edition
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) – 2001 edition
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) – 2002 / 2005 edition
- Support of single and multiple instances for STP and RSTP
- BPDU Watch Guard, Root Guard

LINK AGGREGATION
- Support for static aggregate (a.k.a., OmniChannel)
- Support for dynamic aggregate (IEEE 802.3ad)

AUTO-NEGOTIATION
- Speed (10, 100 and 1000 Mbps) and duplex mode (half or full)
- Auto MDIX on 10/100/1000 port (for straight-through or crossover cables)

TRAFFIC CONTROL
- IEEE 802.3x

DHCP
- DHCP Relay, Option 82 and Snooping (including port-MAC-IP binding)

Layer-3 Routing (IPv4)

IP ROUTING
- Static routing, RIP (v1, v2), OSPF (v2) and BGP (v4, including graceful restart)

MULTICAST
- IGMP (v1, v2 and v3) and IGMP snooping
- PIM-SM, PIM-DM and DVMRP

NETWORK PROTOCOL
- Generic UDP relay (including DHCP Relay)
- TCP/IP stack
- ARP

RESILIENCE
- VRRP (v2)

Layer-3 Routing (IPv6)

IP ROUTING
- Static routing, RIP (ng), OSPF (v3) and Multiprotocol Extensions for BGP

MULTICAST
- MLD snooping
- PIM-SM [2], PIM-DM [2]

NETWORK PROTOCOL
- Generic UDP relay (including DHCP Relay)
- TCP/IP stack
- NDP

RESILIENCE
- VRRP (v3)

Layer-3 Routing (IPX)

IP ROUTING
- Static routing and RIP/SAP

Convergence

PRIORITY QUEUES
- Eight hardware based queues per port

TRAFFIC PRIORITIZATION
- Flow-based QoS in hardware (L1-L4)
- Internal and external (a.k.a., remarking) prioritization

TRAFFIC REDIRECTION
- Policy-based routing
- Server load balancing (including health monitoring of servers)

BANDWIDTH MANAGEMENT
- Flow based bandwidth management, ingress policing / egress shaping
- Port-based egress shaping

Convergence

QUEUE MANAGEMENT
- Configurable de-queuing algorithm
  - Strict Priority
  - Weighted Round Robin
  - Deficient Round Robin

POWER-OVER-ETHERNET
- IEEE 802.3af (requires OS9-GNI-P24 and PoE shelf)
- Maximum power of 2400W (600W per PSU) using the OS9-IP-SHELF
- Maximum power of 240W / 390W using, respectively, the OS9-IPS-0230A [3] / OS9-IPS-0390A [3]

Security

TRAFFIC FILTERING
- Flow-based filtering in hardware (L1-L4)

USER AUTHENTICATION
- IEEE 802.1X, with Group Mobility and Guest VLAN support
- MAC Based Authentication for non 802.1X host
- Authenticated VLAN (web and telnet based authentication)

SWITCH PROTOCOL SECURITY
- MD5 for RIPv2, OSPFv2 and SNMPv3
- SSHv2 for secure CLI session (including Secure Copy)
- SSL for secure HTTP session

SWITCH MANAGEMENT
- Local authentication database
- Remote authentication RADIUS, TACACS+, LDAP and ACE servers

Management

CONFIGURATION MODE
- Command Line Interface
- Telnet/SSH for remote CLI access
- Web-base (HTTP / HTTPS)
- SNMP v1/v2c/v3 for complete NMS integration

MANAGEMENT ACCESS TYPE
- Serial console port for local and remote (modem dial up) access (RJ45)
- Out-of-band Ethernet access (10/100/1000 RJ45)
- In-band Ethernet access

SYSTEM MAINTENANCE
- Port mirroring (one-to-one, many-to-one)
- RMON (Remote Monitoring): statistics, history, alarm and events
- sFlow™
- Local and remote logging (Syslog)
- Detailed statistics / alarm/debug information per process
- L3 OAM (ICMP Ping and Traceroute)
- NTP (Network Time Protocol)
- Internal flash (Compact Flash) to feature:
  - working directory
  - certified directory

SYSTEM FILE TRANSFER
- Xmodem
- FTP (File Transfer Protocol)

Service and support

DEFAULT WARRANTY
- 1 year on hardware, 90 days on software

SUPPORT BASIC
- One year – 7x24 phone. Includes e-service web access, software releases and repair and return of hardware to be completed in 10 business days from receipt.

SUPPORT PLUS
- One year – 7x24 phone. Includes e-service web access, software releases and advanced shipment for next business day arrival of replacement hardware.

(2) Contact your local Alcatel-Lucent representative for availability

(3) Supported only on the OS9600

Ordering information

BUNDLES

OS9600-CB-A	OS9600 base bundle, to include OS9600 chassis, fan tray, 1 CMM, 1 PSU
OS9600-RCB-A	OS9600 redundant bundle, to include OS9600 chassis, fan tray, 1 CMM, 2 PSUs
OS9700-CB-A	OS9700 base bundle, to include OS9700 chassis, fan tray, 1 CMM, 2 PSUs
OS9700-RCB-A	OS9700 redundant bundle, to include OS9700 chassis, fan tray, 2 CMM, 3 PSUs
OS9800-CB-A	OS9800 base bundle, to include OS9800 chassis, fan tray, 1 CMM, 3 PSUs
OS9800-RCB-A	OS9800 redundant bundle, to include OS9800 chassis, fan tray, 2 CMMs, 4 PSUs

CHASSIS AND POWER SUPPLIES

OS9600-CHASSIS	OS9600 chassis and fan tray
OS9700-CHASSIS	OS9700 chassis and fan tray
OS9800-CHASSIS	OS9800 chassis and fan tray
OS9-PSU-0600A	600W AC PSU (100-240V) for OS9000
OS9-PSU-0600D	600W DC PSU (48V) for OS9000
OS9-IP-SHELF	External PoE rack for the OS9000 chassis. Rack to include 1 PSU (OS9-IPS-0600A)
OS9-IPS-0600A	600W AC power-over-Ethernet PSU (100-240V) for use with OS9-IPSHELF only
OS9-IPS-0390A	390W AC power-over-Ethernet PSU (100-240V) for standalone use [3]
OS9-IPS-0230A	240W AC power-over-Ethernet PSU (100-240V) for standalone use [3]

MANAGEMENT AND FABRIC MODULES

OS9600-CMM	Chassis Management Module for the OS9600 and OS9700 [4]
OS9700-CMM	Chassis Management Module for the OS9600 and OS9700 [4]
OS9800-CMM	Chassis Management Module for the OS9800

SOFTWARE

OS9-C20L-UPG	Software upgrade for OS9-GNI-C20L to provide 1000BaseT support on RJ45 ports (one license required per module)

NETWORK INTERFACE CARDS

OS9-XNI-U2	2-port 10GigE XFP
OS9-XNI-U6	6-port 10GigE XFP
OS9-GNI-U24	24-port GigE SFP
OS9-GNI-C24	24-port GigE (10/100/1000) RJ45
OS9-GNI-P24	24-port GigE (10/100/1000) RJ45 w/PoE
OS9-GNI-C48T	48-port GigE (10/100/1000) MRJ21
OS9-GNI-C20L	20-port Fast Ethernet (10/100 – SW upgradable to 10/100/1000) RJ45 and 2-port GigE (100/1000) SFP

TRANSCEIVERS AND CABLES

XFP-10G-SR	10 Gigabit Ethernet optical transceiver (XFP MSA – up to 2km)
XFP-10G-LR	10 Gigabit Ethernet optical transceiver (XFP MSA – up to 10km)
XFP-10G-ER40	10 Gigabit Ethernet optical transceiver (XFP MSA – up to 40km)
XFP-10G-ZR80	10 Gigabit Ethernet optical transceiver (XFP MSA – up to 80km)
SFP-GIG-SX	Gigabit Ethernet optical transceiver (SFP MSA – up to 550m)
SFP-GIG-LX	Gigabit Ethernet optical transceiver (SFP MSA – up to 10km)
SFP-GIG-LH40	Gigabit Ethernet optical transceiver (SFP MSA – up to 40km)
SFP-GIG-LH70	Gigabit Ethernet optical transceiver (SFP MSA – up to 70km)
SFP-GIG-xxCWD60	Gigabit Ethernet CWDM optical transceiver (SFP MSA – up to 60km – 8 wavelengths)
SFP-GIG-EXTND	Gigabit Ethernet optical transceiver (SFP MSA – Gigabit extender up to 2km)
SFP-DUAL-MM	Dual Speed (100FX – 1000LX) optical transceiver (SFP MSA – up to 2km (FX) / 550m (LX))
SFP-DUAL-SM10	Dual Speed (100FX – 1000LX) optical transceiver (SFP MSA – up to 10km (FX and LX))
MRJ21-COMBO-2	2m combo set for OS9-GNI-C48T composed of 8 cables (2m, MRJ21 to RJ45) and 1 patch panel
MRJ21-COMBO-5	5m combo set for OS9-GNI-C48T composed of 8 cables (5m, MRJ21 to RJ45) and 1 patch panel
MRJ21-COMBO-10	10m combo set for OS9-GNI-C48T composed of 8 cables (10m, MRJ21 to RJ45) and 1 patch panel

(3) Supported only on the OS9600

(4) The CMM for the OS9600 and OS9700 are identical

Alcatel-Lucent OmniSwitch 9000

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